ATTACHMENT C

Comments of Forensic Technology, Inc. on the Technical Evaluation: Feasibility of a Ballistics Imaging Database for All New Handgun Sales

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Introduction

Forensic Technology, Inc. ("FTI") submits these comments in response to the Department of Justice's Firearms Division's *Technical Evaluation: Feasibility of a Ballistics Imaging Database for All New Handgun Sales* ("*Evaluation*").[1] FTI is the recognized industry leader in the use of computerized ballistics technology to solve crimes.[2] Its technology -- the Integrated Ballistics Identification System ("IBIS") -- has been selected for deployment nationwide at approximately 225 forensic laboratories by the National Integrated Ballistic Information Network ("NIBIN") Board made up of representatives of the Federal Bureau of Investigation ("FBI"), Bureau of Alcohol Tobacco and Firearms ("ATF"), and a representative of state and local law enforcement, currently the Police Commissioner of Boston. Also, FTI has been

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[1] These comments incorporate the impressions of a number of FTI personnel who have reviewed the *Evaluation.* These individuals collectively represent years of extensive expertise and experience in a variety of areas including the engineering of automated ballistics identification systems, firearms examination, and law enforcement, particularly in the area of firearms violence reduction programs and firearms law and regulation.

[2] FTI's pre-eminence in the industry has been recognized by the Bureau of Alcohol, Tobacco & Firearms, in its report "The Missing Link: Ballistics Technology That Helps Solve Crimes," (ATF September 2001) which is attached hereto as Exhibit A.

selected by 24 nations around the world to provide its IBIS technology to support their law enforcement programs.

When the California Legislature enacted AB 1717, mandating a study of ballistics identification systems to determine the feasibility and potential benefits to law enforcement of a statewide system, the Legislature expected that the study would be both comprehensive and fair. The current draft is neither. The *Evaluation* is inadequately researched and premised on speculation. It reaches sweeping conclusions based on little more than an overly pessimistic view of the technology and the value of ballistics evidence. Although the Firearms Division did not give FTI the opportunity to review the entire *Evaluation* until November 2, it was immediately clear that these deficiencies pervade the entire report. Frederic A. Tulleners, the author of the *Evaluation* disfavors IBIS, and goes to great rhetorical lengths to discredit the technology. In the first paragraph of his report, he concludes that it is "impractical" to apply existing technology to the mass sampling of firearms because a "huge inventory of potential candidates will be generated for manual review." Mr. Tulleners states that this "will likely create logistic complications so great that they cannot be effectively addressed." *Evaluation*, Executive Summary 1.0. He concludes all of this based upon a single study using a database of only 792 identical guns, even though he acknowledges that two of the seven planned tests in this study were not conducted and that the tests he conducted "cannot truly simulate" the large database he foresees. *Evaluation*, Appendix B-1. It is hard to imagine how such broad conclusions were reached based upon so little information. Moreover, it is not clear that the California criminalists and forensic scientists listed in the Acknowledgements to the *Evaluation* actually subscribe to the *Evaluation's* conclusions.

The true facts establish that IBIS is a workable technology, currently providing significant real-life law enforcement benefits. As of December 1999, computerized firearms identification systems in the United States stored more than 800,000 images from firearms used to commit crimes at 225 sites and produced more than 8,000 "cold hits" in more than 16,000 cases. According to John W. Magaw, then Director of ATF, "Computer ballistic imaging technology is the most important forensic advancement since the development of the comparison microscope over 70 years ago." The key fact, which the drafter of the *Evaluation* largely ignores, is the incredible progress the computerized ballistics technology has made in a scant six years. This record of progress should give great confidence that the existing technology works well and can successfully meet the challenges of larger and larger databases envisioned by AB 1717. Instead of branding the idea "impractical," the *Evaluation* should consider the modifications needed to achieve the law enforcement benefits envisioned for the new program. Almost seven years ago, the author of the *Evaluation* doubted that FTI's technology could be successful. Events showed that the technology could be expanded and improved to meet the needs of the law enforcement community. That is the promise of this technology's record of progress. Steady, solid advances have been made in the last six years, which is why scores of law enforcement agencies in this country and around the world are devoting substantial resources to IBIS. The benefits of automated ballistics technology to law enforcement and the public, which have already been proven, are too great to be obscured by the *Evaluation's* overly pessimistic conclusions based on conjecture.

The *Evaluation* misses the true significance of the IBIS technology, which is to provide new leads for crime investigations that would not be achievable without the technology. Every IBIS "cold hit," which is later confirmed by a firearms examiner using a comparison

microscope, is a new lead that would not have existed but for the technology. The manual examination of ballistics evidence from unrelated crime scenes without automation technology is impractical. Thus, when the *Evaluation* reports that its performance test of IBIS showed a 62% match rate or a 37% match rate, depending on the ammunition used, this does not support the conclusion that the technology is "impractical" for large databases. Instead, it is strong evidence that IBIS works. FTI believes that this test used an unfair sample of cartridges, producing an artificially low match rate. However, it must be recognized that whatever the match rate, every one of these cold hits represents a new lead for investigation that would not have existed without IBIS. Thus, the test results of the *Evaluation* do not support its conclusion that it is "impractical" to use IBIS for large databases. If anything, they demonstrate that IBIS will meet the expectations of AB 1717 if it is properly deployed.

FTI believes that an open-minded review of the IBIS technology should result in two conclusions, only one of which the *Evaluation* reaches. The first conclusion, which both FTI and the author make, is that further study of this subject is necessary. As discussed below, FTI recommends that a pilot project be undertaken over the course of three years. Among the many things a pilot project could study, which the *Evaluation* does not even consider, is the filtering of large databases based on gun class characteristics, dates, regions, and other factors to reduce sample sizes and increase processing efficiencies. That, along with more powerful hardware and software and the natural development of more complex correlation algorithms, holds the promise of improving the already considerable success of IBIS. The second conclusion, which completely eludes the *Evaluation's* author, is that the developing IBIS technology will provide a near-term solution for the challenges posed by large databases. Instead of recognizing the achievements of IBIS with databases built upon guns obtained through

criminal investigation, and considering the changes needed for larger databases, the *Evaluation* simply dismisses the idea. The experience of law enforcement is that IBIS can be used to create a database of images of the unique markings on cartridge cases, and that database can be used to find high confidence matches of cartridge cases discharged from the same firearm, providing significant new leads for solving crimes. Although the *Evaluation* notes that the current processing power and speed of the IBIS technology is sufficient, it never considers how this proven technology would work in this new environment. That is a major failing.

Discussion

The *Evaluation* has three serious shortcomings that strongly indicate that the *Evaluation* did not achieve its intended purpose. First, the *Evaluation* has an overly pessimistic view of automated ballistics technology that discredits its conclusions. Second, the *Evaluation* uses unsupported criticism of the value of ballistic evidence as a means of discounting the effectiveness of this technology. Third, the *Evaluation* contains significant errors and omissions and often resorts to conjecture rather than evidence.

FTI agrees with one conclusion of the *Evaluation* -- that more study of the use of this technology in larger databases is needed. The crime-solving potential of this technology and its potential value to the public are too substantial to make decisions in this area hastily without more complete investigation.

1. An Overly Pessimistic And Unsubstantiated View Of The Technology Pervades The *Evaluation*

It is clear from the opening page of the *Evaluation* that the author is not in favor of automated ballistics technology. The *Evaluation* concludes in the Summary at page 1 that if

test specimens from newly-manufactured firearms are entered into an automated database, too large an inventory of potential candidates will be generated for manual review because computer-matching systems do not generate conclusive results. In so concluding, the *Evaluation* is dismissing proven technology on the basis of conjecture. The results of the *Evaluation* simply do not support this conclusion. In addition, existing databases in real life conditions have a proven history showing that the technology is capable of identifying matching cartridge casings fired from the same firearm. To characterize what was studied here with such statements as "the number of candidate cases will be so large as to be impractical and will likely create logistic complications so great that they cannot be effectively addressed" is reminiscent of ill-advised comments made 25 years ago regarding automated fingerprint systems. As we now know, these comments have proven to be incorrect, as a few facts will show.

At present, several existing databases store approximately 60,000 exhibits each and regularly make cold hits. That performance is now possible because between 1995 and 2000, the computational power of the IBIS system increased by a factor of 10. At the same time, the accuracy of correlation algorithms was significantly increased. IBIS version 1.0 was released September 1996, including a bullet and a cartridge case module, a Windows NT operating system, and an Oracle database. In April 1997, IBIS version 2.0 was released with enhancements to the acquisition system and a new correlation process. In May 1998, IBIS version 3.0 was released. Until then, the system was able to correlate cartridges based on firing pin and breech face marks. The new version added ejector marks, and is useful for a wide variety of automatic weapons. A significant weakness of the *Evaluation* is that it does not recognize the capability of IBIS in this regard. In February 2000, IBIS version 3.2 was released. This gave IBIS the ability to acquire rim fire impressions and large primer shotshells, and it

increased the data acquisition speed of the system. In September 2000, IBIS version 3.3 was released to meet the requirements of DRUGFIRE users as IBIS supplants this out-dated system. In August 2001, IBIS version 3.4 was released. It made general improvements recommended by the users.

The *Evaluation's* failure to consider this progress raises serious doubts regarding the author's objectivity. Adding to these doubts are the pervasive tendencies of the author to substitute opinion in the place of fact where facts are not available and to adopt the most negative view of every issue. A prime example of both tendencies is found in the wording of Section 1.1.2 of the Executive Summary, which states:

> Current systems may not be as efficient for rim fire firearms and are limited to auto loading weapons. Proposed systems will not practically accommodate revolvers, rim fires, certain shotguns and rifles. A large proportion of firearms sold in CA may never make entry into the system.

FTI has made information available to the Firearms Division, which shows that its system can accommodate revolvers, rim fires, certain shotguns and rifles.[3] If the issue is the efficiency of current systems with rim fire cartridges, that functionality could have been tested, but was not. In the absence of such testing, the statement that they "may not" be as efficient prejudges the issue, as it would be equally valid to say the current system may be even more efficient with rim fire cartridges. More importantly, the *Evaluation* misses the critical point that the realistic objective of the database should not be to capture every gun sold in California. Instead, it should concentrate on those guns most frequently associated with crime --- auto-loading pistols in calibers .25 through .45 that have appeared in the listing of the top crime handguns traced by

[3] Indeed, in a footnote to Section 1.3, the *Evaluation* recognizes that the system can image rim fires.

ATF statistics. Thus, the comments regarding shotguns and rifles are irrelevant. Indeed, AB 1717 is limited to handguns and required no study or comments regarding long guns.

Similarly, rather than observing that "a large proportion of firearms sold in CA may never make entry into the system," it would be more valid to conclude that targeting auto-loading handguns would build a database more relevant to law enforcement needs because these firearms are widely acknowledged to be more likely to be used in crime. See ATF Youth Crime Gun Trace Reports at www.atf.treas.gov. In fact, the IBIS system can accommodate revolvers. However, this is not particularly relevant because "revolver cartridges will not be entered due to the low frequency of revolver cartridge casings found at crime scenes" (*Evaluation,* Section 1.3).[4] That the author saw fit to raise the question of revolvers in this negative fashion in the Executive Summary is another indication of the overly pessimistic outlook against the technology.

Another example of this negativity is found in Section 5.8, pertaining to the effect of Senate Bill 15 ("SB 15") on database uniformity, where the author speculates that this legislation will cause greater uniformity of markings and therefore make it harder to distinguish between manufacturers and to find matches. A more likely and accurate view is that SB 15 may help increase the effectiveness of a Ballistic Identification Databank Program. SB 15 will apply standards that will tend to weed out guns made from poor processes and materials, which the *Evaluation* states do not repeatedly mark well. It would thus be reasonable to assume that, as time passes, better quality guns that pass SB 15 tests will produce more consistent marks over longer periods of time. Nonetheless, the *Evaluation* fails to recognize that a pilot project could

[4] In addition, the ballistics information that is in fact entered into the system is a policy decision, as there is no reason to add guns that are seldom, if ever, used in criminal activity.

consider ways that the Legislature can set standards to ensure better marking on fired ammunition components.

The pessimism shown in the *Evaluation* is not limited to the technology, but extends to FTI as a company. The most striking example of this is found in Section 6.5 - Open Image Standards. In this section, the *Evaluation* seems more concerned with the prospect that a single contractor, FTI, may be awarded a contract than with the critical issue that any new ballistic system such as a Ballistic Identification Databank Program must be compatible with the already-existing NIBIN national network of ballistic evidence administered by ATF. This compatibility is essential so that evidence recovered at crime scenes can be processed against a future California Ballistic Identification Databank Program.

Another example of the author's attitude against FTI is observed in Section 6.2 - System Capabilities and Cartridge Case Identification Issues. The *Evaluation* criticizes a statement in the FTI paper entitled "The Methods And Technology For 'Ballistic Fingerprinting' And Their Practical Applications" (2nd ed. January 2001) (Exhibit D) concerning the "uniqueness" of impressions left on fired ammunition components during discharge. The *Evaluation* asserts that the term "unique" must be qualified because all marks are not unique. However, the FTI version is not very different from the information contained in the *Evaluation* itself. In Section 2.4 - Description of Firearms Evidence, the *Evaluation* states, "Individual characteristics are those marks, that include striae and other imperfections that make a particular fired bullet or cartridge case unique and serve as the basis for a conclusive identification." Thus, it recognizes the same "uniqueness" recognized by FTI. Further, in Section 6.2, the *Evaluation* turns to what can only be characterized as speculation about how the IBIS algorithm might be improved, despite the fact the author has no experience in the development and use of FTI's

algorithms. As this information is proprietary to FTI, it was not made available for the *Evaluation*.

The *Evaluation* also is flawed when it categorically rejects the technology and discounts real-world evidence that IBIS significantly raises the probability of solving violent crimes. Criminals use firearms to commit approximately 440,000 violent crimes each year in this country. See "Crimes Committed With Firearms," United States Senate Committee on the Judiciary (Majority Staff Report September 15, 1999) at 2, www.senate.gov/~judiciary/guns106. There is nearly universal acknowledgement that the aggressive prosecution of criminals who use firearms illegally will produce a substantial drop in violent crime. It also is widely recognized that ongoing programs that incarcerate armed criminals for longer periods will prevent future crimes. Therefore, any law enforcement effort that can lead to the arrest of more armed criminals and can enhance firearms prosecutions by even a small percentage likely will have a significant impact on crime. The impact will be most dramatic over the long term because the number of future crimes avoided will be significantly increased as each year more and more criminals are removed from the streets.

2. Criticisms Of Ballistic Evidence Should Not Equate To Criticism Of The Technology

The *Evaluation's* tendency to criticize the technology by noting the problems generally inherent in ballistic evidence is both misleading and beside the point, as it does not address the topic the Legislature sought to have studied. Although ballistic evidence is well-recognized as an effective crime-fighting tool, it also is well recognized that at times this evidence can be of limited value because it sometimes lacks sufficient marks to be matched by a trained firearms examiner using a comparison microscope. Problems in the nature of the

evidence do not in any way diminish the need for automated systems that will quickly process ballistic evidence with sufficient marks in order to solve crimes.

An example of this tendency in the *Evaluation* is found in Section 1.1.5, which concludes that:

> Firearms that generate markings on cartridge casings can change with use and can also be readily altered by the user. They are not permanently defined identifiers like fingerprints or DNA. Hence, images captured when the firearm is produced may not have a fixed relationship to fired cartridge casings subsequently recovered.

To the contrary, currently available research indicates that fixed relationships remain after thousands of subsequent firings. Data from the FBI and ATF, as of December 1999, show that the use of ballistics technology in this country over the last several years has produced more than 8,000 matches linking guns and providing leads in more than 16,000 incidents. Obviously, the markings maintained a fixed relationship in those cases and the criminals using those guns did not take evasive measures. Moreover, if criminals took active steps to alter the firing pins of their guns, manual examination under a microscope would prove no better than automated technology. Thus, the *Evaluation's* criticism is irrelevant and does not undermine the importance of automated ballistics technology. Indeed, this criticism is more "urban legend" than reality. The use of the comparison microscope by trained firearms examiners has been common since the 1920's. Today, there are about 900 professional firearms examiners busy every day in approximately 225 forensic laboratories around the country comparing ballistics evidence, which has not lost its usefulness as the weapons have been discharged repeatedly over time or because criminals have altered their firing pins.

The *Evaluation* also discounts ballistic imaging technology because marks from a set of cartridges discharged by the same firearm are less predictable than fingerprints and DNA, which normally do not change. However, this fact is true whether automated matching techniques are used or not, and does not discredit the technology. Firearm examiners have dealt with this fact for decades, and still have been able to make matches that help solve crimes. IBIS has shown that cartridge case marks can be used effectively to help solve literally hundreds of criminal cases per year, despite wider variations than some biometrics. Where fingerprints, DNA, and other forensic investigative aids are widely acknowledged to have crime-solving limitations that are not avoided by automation technology, the *Evaluation* appears to hold the crime-solving value of automated ballistics technology to a higher standard. In fact, in firearms cases, fingerprint evidence is very seldom found, yet ballistics evidence often abounds. Implying that an automated ballistics examination has no value in solving crime because there are inherent limitations in ballistics evidence is both contrary to fact and out of place in the *Evaluation*.

The IBIS technology can assist firearms examiners by extending their ability to process more of the available ballistics evidence, and the value of such technology is widely recognized. In November 1997, ATF began receiving firearms-related evidence from the International Tribunal for the former Yugoslavia collected from the Ovcara mass burial site in Bosnia. Using IBIS, 1466 cartridge casings were processed and linked to 18 different firearms used in this mass murder. In the summer of 1998, the Tribunal convicted a defendant based in part upon the laboratory report of this work. According to ATF, "this case would have been impossible to complete without IBIS because of time and personnel constraints." See, "The Missing Link: Ballistic Technology That Helps Solve Crimes," at 18-19 (ATF September 2001) (Exhibit A).

The same tendency to discount the technology because of the nature of the evidence is apparent again when the *Evaluation* notes in Section 1.1.6 that "Cartridge casings from different manufacturers of ammunition may be marked differently by a single firearm such that they may not correlate favorably." The author again puts a negative spin on the facts. While what is stated is possible, it is at least just as possible that the different cartridge casings would be marked similarly enough to be correlated favorably. Again, to the extent the *Evaluation's* statement is true, it would be true whether the ballistics examination is done by computer or by a human review, and is not a reason to discard the technology.

Automated computer comparison systems can provide a list of the most likely candidates for a ballistics match among large quantities of data at speeds far beyond human capability. Although the *Evaluation* questions the ability of the technology to differentiate and correlate massive amounts of data, the review described in the *Evaluation*, based on a database of only 792 identical guns, did not extend far enough to resolve the central issue of whether the technology can deal effectively with the large inventories of data involved in the concept of mass sampling of manufactured firearms. Of the 50 duplicate cartridge cases used in the *Evaluation*, eight could not be matched through manual examination by John O'Neil, a well-known firearms examiner with more than 30 years of experience. The use of these cartridge cases clearly skewed the *Evaluation's* results.

Moreover, of the remaining 42 duplicate cartridge casings, approximately half had markings that were somewhat unfavorable. Mr. O'Neil did not have sufficient time to determine whether each of these specimens was suitable for microscopic comparison. However, it is quite possible that some of these specimens could not have been matched using microscopic comparison. That is a significant concern because the conclusion of the *Evaluation* that the IBIS

technology is "impractical" for large databases is founded on the hypothesis that an automated examination of a database of specimens from guns of the same model and caliber that does not produce a high level of correlations means that the automated examination would be overwhelmed by a large database in the real world. There are many reasons why this hypothesis is probably not valid. However, it is immediately obvious that the performance of an automated examination could not, and should not, be more accurate than a microscope comparison by a firearms examiner. Thus, to the extent that the *Evaluation* included cartridge cases that had insufficient marks to be identified by a firearms examiner, the results cannot support the hypothesis, and the *Evaluation* must be without scientific value.

The only other known study of the type conducted by the *Evaluation* is a cartridge case study conducted this year by FTI using 500 GLOCK 9 mm guns of the same model. The results are attached to these comments as Exhibit B, and the entire study has been provided to the author of the *Evaluation*.[5] The GLOCK study produced much higher match rates -- in the 83% to 85% range -- than the Smith & Wesson study conducted for the *Evaluation*. FTI believes that this difference would be significantly reduced if the study sample of Smith & Wesson cartridge cases had eliminated the examples that could not be matched by a trained firearms examiner, doing a manual comparison.

The *Evaluation* in Section 1.1.5 notes that in its test of 50 pairs of cartridge cases from the same manufacturer, 38% were missing from the top 15 ranks. However, 48% had either the breech face or the firing pin in the 1st rank, and 62% had either the breech face, or the firing pin or both in the top 15 ranks. These results are sufficient to identify a significant number

[5] A summary of the GLOCK study also is attached as Exhibit C.

of cartridge cases that merit manual study and would have produced new cold hits. However, the percentages reported by the *Evaluation* would have been even higher if the unmatchable examples identified by Mr. O'Neil had been eliminated. For example, the 62% statistic would have increased to 74%. Even though this is less than 100%, these "cold hits" in the real world would be new leads for the police to pursue. Similar cold hits are leading police around the world to identify, prosecute and incarcerate more armed criminals, thereby reducing current and (most importantly) future crime rates. The contribution of the system to the community should be measured, not by the probability of getting a match, but by the number of criminal cases for which a new valid lead is provided, which could not be provided by manual ballistics examinations alone. As the *Evaluation* finds, IBIS may perform one correlation batch of more than 100,000 entries in the database within 1.5 hours. Assuming IBIS is used 24 hours a day (which implies 6,000 correlation batches per year), even at the 62% rate, this would result in a substantial number of new leads that would not have existed without IBIS.

With respect to Section 1.1.8, which concludes that "fired cartridge casings are easier to correlate than fired bullets," it is true that while the ability to match cartridge casings is better than matching bullets, both correlations are performed by the computer and one "correlation" is not any "harder or easier" from the user's standpoint. However, acquisition of fired bullets is more time-consuming and because of the greater number of variables involved, the ability to make positive matches is lower than for cartridge casings.[6]

Simply because not all firearms generate markings on cartridge casings that can be identified back to the firearm (as the *Evaluation* finds in Section 1.1.9), is not a reason not to

[6] The inclusion of this item in the Executive Summary also raises questions about the author's intent, as it was not a matter included in the *Evaluation*.

pursue this technology. Aside from the fact the *Evaluation* made no attempt to determine what percentage or types of firearms would be included in this restricted group, this is an instance where FTI's technology has an advantage, as it can conduct firing pin correlations even when the breech face correlation is absent, as well as using an Ejector correlation. The technology thus provides three sources to link guns instead of only one.

3. The *Evaluation* Has Critical Omissions And Errors And Relies Upon Conjecture Rather Than Evidence.

One of the central problems with the *Evaluation* is that it relies upon incomplete data. The *Evaluation* makes its negative conclusions after reviewing tests that were performed over two sets of 50-72 test-fired cartridge cases with sister counterparts in a larger database of 792 exhibits. However, the result of the automated correlation algorithm was never compared to an actual analysis done by human firearm examiners. This lack of comparison with human data is crucial and sufficient to raise doubts about the *Evaluation's* main conclusions. The goal of IBIS is to reach the same conclusions that firearms examiners would have reached if they had the time to examine manually an entire database. Without comparing the computer results to the human results, the study is simply incomplete.

Powerful evidence supporting IBIS on this very point of the comparability of automated and manual examinations was provided to the author of the *Evaluation* by Dominic Buccigrossi, then a Sergeant and Quality Manager in the forensic laboratory of the New York City Police Department. By letter dated April 16, 2001, Sergeant Buccigrossi communicated the results of a manual and automated (using IBIS) examination of two sets of eight cartridge cases from two guns provided by the author of the *Evaluation*. Sergeant Buccigrossi reported that IBIS produced similar results to manual examination by identifying matches among the cartridge

cases bearing marks that were recognizable manually, and by failing to recognize matches for cartridge cases that had insufficient marks to be recognized manually. These results were particularly noteworthy because they were achieved using the NYPD's entire database of cartridge cases, the largest existing database in the United States. FTI deplores the fact that these results conducted by independent police personnel were not reported by the *Evaluation*.

The *Evaluation* also is missing critical relevant data**.** The *Evaluation* does not discuss studies published by members of the Association of Firearm and Tool-mark Examiners ("AFTE"), a professional organization of worldwide experts in the field, which relate directly to the issue of longevity of critical markings. Although FTI previously brought this research to the attention of the author of the *Evaluation* and although the longevity of markings seems to be of substantial interest to the author, there is no mention of this information. The following research clearly undermines the *Evaluation* statements regarding longevity:

James E. Hamby, "Identification of Projectiles," AFTE Journal, Vol. 5, No. 4, at 22.

Robert J. Shem and Peter J. Striupatis, "Comparison of 501 Fired Bullets And Cartridge Cases From A 25 Caliber Raven Pistol," AFTE Journal, Vol. 15, No. 3, at 109.

Shane J. Kerby, "Comparison of 900 Consecutively Fired Bullets and Cartridge Cases from a 45 caliber Smith & Wesson Revolver," AFTE Journal, Vol. 15, No. 3, at 113.

Yoshimitsu Ogihara, Mitsumasa Kubota, Munekichi Sanada, Kazuo Fukuda, Tsuneo Uchiyama, and James Hamby, "Comparison Of 5000 Fired Bullets and Cartridge Cases From A 45 Caliber M1911A1 Pistol," AFTE Journal, Vol. 15, No. 3, at 127.

Another omission occurs in Section 1.1.7, where statements are made with no scientific support. The *Evaluation* concludes that there is an increased potential as the database increases in size, for a firearm type to be over-represented in that database, making it more difficult to correlate matches. It does not appear that anything was done during the *Evaluation* to

establish criteria to substantiate this statement. In addition, while it may be accurate and logical that the greater the number of specimens from similarly-produced firearms, the more difficult it is to find a link, more difficult does not mean impossible. Moreover, technology will surely improve just as the database will surely grow.

In other instances, the *Evaluation* makes misleading statements that could give erroneous impressions. For example, in Section 1.1, "Firearms Identification and Automation," the *Evaluation* concludes that current imaging systems require trained personnel, "ideally a firearms examiner, for entry, searching and verification." This statement is misleading in that although training is required, the training required varies for the tasks. It would not be the best use of resources to use a firearms examiner for entry or searching of data. Only the final verification requires a firearms examiner, and thus using the proposed technology would not require a greater number of firearm examiners. Moreover, a small increase in human resources for trained technicians may translate into large improvements in efficiency when combined with the automatic comparison technology. As the *Evaluation* states, the correlation of 100,000 database entries would require only 1.5 hours. A firearms examiner would be needed only for the visual comparison of the most promising cases from the database. Worldwide, in 24 separate countries, almost every user of FTI's technology uses technicians, not firearms examiners, to operate the system. The NYPD has found more than 700 cold hits, all of which were entered and identified as potential hits by non-firearm examiner technicians and then confirmed by a firearms examiner. More than 95% of all NYPD potential hits identified by a technician are confirmed as hits by a firearms examiner.

Other information in the *Evaluation* is simply wrong. For example, in Section 5.6, Data Retention Issues, the *Evaluation* indicates that there are no objective studies related to

California statistics on the length of time it takes for a gun to move from legal purchase to crime. However, there are at least three sources of such information readily available: 1) the data can be found on www.atf.treas.gov as part of the firearms trace studies published by ATF; 2) Dr. Glenn Pierce, of Northeastern University in Boston has done extensive work on the subject; and 3) Dr. Garen Wintemute of the Violence Prevention Research Program at the University of California, Davis, has published a paper relating to the subject, entitled California's Guns and Crime (May 1997).

In yet other instances, the *Evaluation* confuses the reader as to what is fact and what is speculation. An example of this can be found in Section 1.1 - Firearms Identification and Automation, which lists a number of issues to be considered. One is, "As the DNA and fingerprint database increase in size, hits will increase: however, as a firearms image database increases in size, it will become more difficult to find a link." This point concerns the issue of the performance of a database containing hundreds of thousands of exhibits and is a fundamental question that should be studied in a pilot project. That this point is speculation rather than fact is shown by the *Evaluation's* clear statement that most performance tests for large database queries were not performed, as well as the fact that it contains no reference to any studies or testing conducted on DNA or fingerprint databases.

Finally, the *Evaluation* omits significant information that would allow the reader to value the technology appropriately. The *Evaluation* reported in detail on the existence and history of ballistics technologies in the United States, specifically two systems, IBIS and DRUGFIRE, and presented various statistics about these systems. Yet the *Evaluation* failed to report that IBIS and DRUGFIRE have produced more than 8,000 conclusive matches in the United States alone in less than five years between 1995 and 1999 (while IBIS has produced

thousands more in 24 other countries). More significantly, the *Evaluation* failed to make a key observation about this important data: the 8,000 actual cases all represent real time data which show that: 1) criminals did not take evasive measures in those cases to avoid detection and 2) subsequent firings did not produce sufficient changes in the marking characteristics to prevent the technology from finding the match. This is a critical omission. Ballistics technology has made a difference in the way that firearms crimes are investigated throughout the world.

Recommendations

It is clear from the *Evaluation* that further study is merited. The conclusion that IBIS technology is "impractical" is not supported by the available information. Therefore, FTI in the strongest of terms urges that the Executive Summary, and particularly the first paragraph entitled "Summary," be comprehensively revised to reflect the information discussed above which has been omitted and to reflect the serious limitations of the work conducted by the author.

FTI further recommends that the Department of Justice undertake further study in the form of a Ballistic Identification Databank Pilot Project Program. This pilot project should be mandated for an appropriate length of time, such as three years, in order to resolve the issues that this *Evaluation* did not address sufficiently regarding large databases and to address other critical issues that have not even been considered, such as the wide variety of issues concerning the most efficient deployment of limited resources to best use the IBIS technology. Most of these issues are identified in the FTI paper entitled "The Methods And Technology For 'Ballistic Fingerprinting' And Their Practical Applications" (Exhibit D). Such a study should be conducted in a scientific, objective and credible manner by unbiased, recognized authorities who

have had practical experience with ballistics evidence and automated technology. The pilot project should incorporate all of the critical activities required in the operation of a Ballistic Identification Databank Program, including the methods for the acquisition of cartridge cases at the point of sale and the quality assurance of the process, the imaging of the cartridge cases, data storage and retrieval and the actual searching of crime scene evidence in the database. The pilot project could be limited to three pistol calibers, to minimize costs and better focus on issues, protocols and processes that are important to the program and critical to providing police with more useful information needed to solve more shooting crimes.

Despite not receiving the entire *Evaluation* until November 2, 2001, FTI has done its best to provide thoughtful comments on the entire document by November 8, 2001 as requested. FTI may seek to provide additional comments at a later date, should additional matters come to its attention. FTI would be happy to be of assistance to the Firearms Division with respect either to revising the *Evaluation* or conducting further studies.